

## \* NOTICES \*

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the formation method of the thin shape chip corresponding to this with thin-shape-izing of the package of a semiconductor device.

[0002]

[Description of the Prior Art] Wafers, such as silicon used for manufacture of a semiconductor device, are enlarged every year, and that the aperture of whose is 8 inches has also appeared in recent years. The thickness of a wafer is also thick in order that this wafer may maintain the intensity with diameter-ization of macrostomia. On the other hand, the semiconductor device used for this tends to thin-shape-ize the package with the miniaturization of an electric product. Since it corresponds to the package of such a thin shape, the grinding of the rear face of a wafer in which the semiconductor device was formed is carried out, and there is the method of forming a thin chip.

[0003] This method is explained based on the cross section of drawing 5 (a) - (c). First, as shown in drawing 5 (a), in order to form the semiconductor device 11 in wafer surface 1a and to make this wafer 1 into predetermined thickness as the 1st process, the so-called back grinding which carries out the grinding of the wafer side 1b is performed. Subsequently, as the 2nd process, as shown in drawing 5 (b), the slot 12 of the predetermined depth is cut along the street for dividing the chip 13 formed in this wafer surface 1a. And as the 3rd process, as shown in drawing 5 (c), a pressure is applied and cut to a wafer 1 along the slot 12 cut to the wafer 1 at a last process, and it divides into each chip 13.

[0004]

[Problem(s) to be Solved by the Invention] However, when a thin shape chip is formed by this method, there is a problem as shown below. This is explained based on drawing 4. That is, when carrying out the grinding of the rear face of a wafer 1 by the aforementioned method, a wafer 1 is pressurized by the grinding attachment (the following, back grinder) which is not illustrated. If a wafer 1 has a defect 14 at this time, crack 14a will arise in a wafer 1 with this defect 14 as the starting point. If this crack 14a spreads greatly, crack 14a will also attain to circumference chip 13b which adjoins this as well as defective chip 13a which had a defect 14 first among the chips 13 divided by the slot 12, and it will become a poor chip. Furthermore, if this crack 14a spreads in the wafer 1 whole, a wafer 1 may break and a chip 13 may be destroyed totally. Moreover, even if a wafer 1 does not have a defect 14, the more it becomes a diameter of macrostomia, the more a wafer 1 becomes easy to break by thin-shape-izing. Therefore, even if this invention has a defect in a wafer, it aims at offering the formation method of the thin shape chip which can minimize the defect of a chip.

[0005]

[Means for Solving the Problem] this invention is the formation method of the thin shape chip accomplished in order to solve the above technical problem. That is, the slot of the predetermined depth is cut along the street for dividing two or more chips as the 1st process from the front face of a wafer. And masking tape is pasted up for the whole front face of this wafer on a wrap state as the 2nd process. Subsequently, as the 3rd process, the grinding of the rear face of a wafer is carried out, and it divides

into each chip until it removes the pars basilaris ossis occipitalis of the aforementioned slot. And a resin tape is pasted up for the whole rear face of the wafer by which grinding was carried out on a wrap state as the 4th process. And the masking tape pasted up on the surface of the wafer is removed as the 5th process. Finally the resin tape adhered to the rear face of a wafer is extended as the 6th process, and the interval of each chip which carried out [ aforementioned ] division is extended. It consists of the above process.

[0006]

[Function] In case the grinding of the wafer side is carried out since the slot of the predetermined depth is beforehand cut along a street before carrying out the grinding of the wafer side, the crack which spreads in a wafer with a defect as the starting point will stop at this slot. And the chip divided while carrying out the grinding of the wafer side, since masking tape was pasted up on the wafer front face does not come apart. Moreover, if the masking tape adhered to the wafer front face is removed and a resin tape is extended after pasting up a resin tape on the wafer side which carried out grinding, each divided chip will be arranged at the predetermined intervals.

[0007]

[Example] Below, the example of this invention is explained based on drawing. Drawing 1 (a) - (c) is a cross section which explains from the 1st process of the formation method of the thin shape chip of this invention to the 3rd process in order of a process. Hereafter, the process is explained in order.

[0008] First, as shown in drawing 1 (a) as the 1st process, the semiconductor device 11 is formed in wafer surface 1a of a wafer 1, and this semiconductor device 11 is divided by the street which is not illustrated. This street is the boundary line of the chip 13 mentioned later, for example, is prepared in the shape of a grid. The slot 12 of the predetermined depth is cut in the shape of a grid along this street. The depth of this slot 12 is cut more deeply than the thickness of the desired chip 13.

[0009] Subsequently, as shown in drawing 1 (b) as the 2nd process, masking tape 2 is pasted up for the whole wafer surface 1a on a wrap state. This masking tape 2 protects the semiconductor device 11 formed in wafer surface 1a from the pressurization by the back grinder. Furthermore, in the process which carries out the grinding of the rear face of the wafer 1 mentioned later, since this masking tape 2 has pasted up the whole wafer surface 1a on the wrap state in case a wafer 1 is divided into each chip 13, each chip 13 does not come apart. In addition, if ultraviolet rays are irradiated and the resin pressure sensitive adhesive sheet to which the adhesive strength falls will be used as the quality of the material of this masking tape 2, in the below-mentioned process, this masking tape 2 is easily removable.

[0010] And as shown in drawing 1 (c) as the 3rd process, grinding is carried out using the back grinder which does not illustrate wafer side 1b. This grinding is performed until it removes slot pars-basilaris-ossis-occipitalis 12a, and a wafer 1 is made into predetermined thickness. Thus, a wafer 1 can be divided into each chip 13, while thin-shape-izing a wafer 1, if the grinding of the wafer side 1b is carried out until it removes slot pars-basilaris-ossis-occipitalis 12a.

[0011] Here, the breadth of the crack in the wafer by the grinding of the 3rd process is explained based on drawing 3. That is, since a wafer 1 is pressurized by the back grinder, it is distorted according to the force and stress produces it. Thereby, crack 14a on the basis of a defect 14 spreads in a wafer 1. However, since the slot 12 is beforehand cut in the shape of a grid to the wafer 1, crack 14a which spreads the inside of defective chip 13a stops at the slot 12 surrounding this circumference. Therefore, even if crack 14a spreads in which direction, circumference chip 13b is not attained to across this slot 12. Moreover, since it is easy to concentrate the distortion stress added in the wafer 1 in grinding on the pars basilaris ossis occipitalis of a slot 12, even if a crack occurs, it will be divided along this slot 12. Therefore, a chip 13 does not break.

[0012] Next, based on the cross section of drawing 2 (a) - (c), from the 4th process of the formation method of the thin shape chip of this invention to the 6th process is explained in order of a process.

[0013] First, as shown in drawing 2 (a) as the 4th process, the resin tape 3 is pasted up for the whole wafer side 1b by which grinding was carried out at the last process on a wrap state. The resin adhesive tape to which the adhesive strength falls is used for this resin tape 3 by irradiating ultraviolet rays like the above-mentioned masking tape 2.

[0014] Subsequently, as shown in drawing 2 (b) as the 5th process, the masking tape 2 pasted up on wafer surface 1a is removed. That is, ultraviolet rays are irradiated at this masking tape 2, and if adhesive strength with wafer surface 1a is reduced, it can remove easily. In addition, since the resin tape 3 has pasted wafer side 1b even if this masking tape 2 is removed, each chip 13 does not come apart.

[0015] And as shown in drawing 2 (c) as the 6th process, the resin tape 3 pasted up on the whole wafer side 1b is extended. This resin tape 3 has elasticity and the interval of each chip 13 pasted up on the resin tape 3 can open it by extending this. If ultraviolet rays are irradiated in this state at the resin tape 3, the adhesive strength of the resin tape 3 and a chip 13 can decline, and a chip 13 can be easily removed from the resin tape 3. And since the interval of each chip 13 has extended, when adsorbing a chip 13, for example by the collet, the each of can be taken out certainly.

[0016] Next, the case where the chip 13 with a thickness of 180 micrometers is formed after this is explained using the wafer 1 which has the thickness of 550 micrometers as a concrete example using the formation method of the thin shape chip the above-mentioned explanation. First, the slot 12 with a deeper than the thickness of the desired chip 13 depth of 200 micrometers is cut in the shape of a grid along a street from wafer surface 1a according to the 1st process. And after pasting up masking tape 2 on the whole wafer surface 1a at the 2nd process, the grinding of the wafer side 1b is carried out according to the 3rd process. 370-micrometer grinding of it is carried out from wafer side 1b until grinding becomes 180 micrometers in thickness of a chip 13. At this time, since the slot 12 is cut more deeply than the thickness of the desired chip 13, when 370-micrometer grinding is carried out from wafer side 1b, slot bottom 12a will be removed. This will divide a wafer 1 into each chip 13 at the same time it forms the chip 13 with a thickness of 180 micrometers. And according to the 4th process, after pasting up the resin tape 3 on the whole wafer side 1b, the masking tape 2 of wafer surface 1a is removed at the 5th process. Finally, according to the 6th process, the resin tape 3 pasted up on the whole wafer side 1b is extended, and the interval of each chip 13 is extended. The chip 13 with a thickness of 180 micrometers can be formed by the above.

[0017]

[Effect of the Invention] Since the slot of the predetermined depth is cut in the shape of a grid along the street which divides a chip beforehand when the grinding of the rear face of a wafer with a defect is carried out by the back grinder according to the formation method of the thin shape chip of this invention explained above, the crack which spreads in a wafer with a defect as the starting point stops at this slot. For this reason, it does not spread for the chip with which a crack adjoins across this slot. Therefore, the other chip only by only one chip with a defect becoming poor is formed in a thin shape while it has been good. Furthermore, even if a crack occurs to the wafer in grinding, it is divided along a slot. And the divided chip does not come apart with the masking tape adhered to the wafer front face. Therefore, even if it is the wafer of the diameter of a large quantity, a thin chip can be formed with the sufficient yield.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the cross section which explains the formation method of the thin shape chip of this invention in order of a process, and in (a), the 1st process and (b) explain the 2nd process, and (c) explains the 3rd process, respectively.

[Drawing 2] It is the cross section which explains the formation method of the thin shape chip of this invention in order of a process, and in (a), the 4th process and (b) explain the 5th process, and (c) explains the 6th process, respectively.

[Drawing 3] It is a plan explaining the breadth of the defect by this invention.

[Drawing 4] It is a plan explaining the breadth of the conventional defect.

[Drawing 5] It is the cross section which explains the formation method of the conventional thin shape chip in order of a process, and in (a), the 1st process and (b) explain the 2nd process, and (c) explains the 3rd process, respectively.

[Description of Notations]

1 Wafer

1a Wafer front face

1b Wafer side

2 Masking Tape

3 Resin Tape

12 Slot

12a Slot pars basilaris ossis occipitalis

13 Chip

14 Defect

14a Crack

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CLAIMS

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[Claim(s)]

[Claim 1] The formation method of the thin shape chip characterized by providing the following. The 1st process which cuts the slot of the predetermined depth from the front face of a wafer along the street for dividing two or more chips. The 2nd process which pastes up masking tape for the whole front face of the aforementioned wafer on a wrap state. The 3rd process which carries out the grinding of the rear face of the aforementioned wafer, and is divided into each chip until it removes the pars basilaris ossis occipitalis of the aforementioned slot. The 6th process which extends the resin tape adhered to the 4th process which pastes up a resin tape for the whole rear face of the aforementioned wafer by which grinding was carried out on a wrap state, the 5th process which removes the masking tape adhered to the front face of the aforementioned wafer, and the rear face of the aforementioned wafer, and extends the interval of each chip which carried out [ aforementioned ] division.

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[Translation done.]